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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEE, TIMOTHY L	
ART UNIT	PAPER NUMBER
2662	17

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Please find below and/or attached an Office communication concerning this application or proceeding.

PRL

Office Action Summary	Application No. 09/540,729	Applicant(s) GURA ET AL.
	Examiner Timothy Lee	**Art Unit** 2662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 January 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-6,8-23 and 26-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-6,8-23 and 26-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 15,16.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 8-23, and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calvignac et al. (US 6,370,148).

3. Regarding claims 1, 13, 15, 16, 17, 19, 23, and 27, Calvignac et al. discloses a data communication system that includes an improved arbiter that handles bursty traffic with improved fairness. As shown in Fig. 1, there are a number of inputs (a, b, c, and d) and a number of outputs (A, B, C, and D) into and out of the crossbar switch fabric, where the inputs are connected to an arbiter—the crossbar switch fabric provides for various lines that the inputs can connect to the outputs, thus providing a host of resources that the various inputs can use to reach the outputs (sharing multiple resources among multiple requesters using an arbiter). The arbiter 110 is responsible for controlling the crossbar switch fabric via the control lines so as to repeatedly select the subset of input-output combinations which maximizes the utilization of the output ports, with the constraint inherent in a crossbar switch that at any time each input can only be connected with one output and each output can only be connected to one input. See col. 4, lines 32-38. Fig. 5 shows an example of how the connections are chosen in the current scheme. First, the row is chosen which has the lowest number of requests, where the rows correspond to the different inputs, so in step 1 of Fig. 5, row b is chosen because it is only requesting to send

data to output B and only to output B—the other three inputs are requesting to send data to more than one output. Thus, a relationship is formed where priority in assigning resources is inversely related to the number of requests that a particular input is making and can also be considered a requester priority (determining priorities corresponding to requests for resources…priority being inversely related to a number of requests made by a particular resource). After a particular input-output combination has been chosen, that row-column selection is then inhibited in further selections. See col. 6, lines 20-49.

4. Calvignac et al. does not expressly disclose assigning priority to each requested resource according resource priority. However, it would have been obvious to a person of ordinary skill in the art to assign priority according to resource priority as opposed to requester priority. One would have been motivated to do this because if a designer of a similar system was more concerned with the utilization of the resources, then the input-output combinations would be chosen according to the number of requests for each resource, not the number of requests by each requester. The two techniques accomplish the same goal of maximizing the number in input/output connections. In looking the example given in Fig. 5, the same results would have been achieved if the *column* with the lowest number of requests was given the highest priority, and the algorithm was performed in the same way shown in Fig. 5, except using a column perspective as opposed to a row perspective. In the example of Fig. 5, both techniques would achieve the same results.

5. Regarding claim 2, as shown in Fig. 5, rows a, c, and d are requesting multiple resources.

6. Regarding claim 3, as shown in Fig. 5, columns A and D are being requested by multiple requesters.

7. Regarding claims 4, 5, 6, 14, 18, 20, and 28, Calvignac et al. discloses using a double round-robin approach to form the request and fairness matrices that are used in selecting the connections. See at least col. 5, lines 31-67. Calvignac et al. also mentions that any priority scheme used within the rearrangement matrix must ensure that each request has a high probability of being eventually selected, or in other words, to prevent starvation. See col. 6, lines 55-60.

8. Regarding claim 10, as mentioned previously, the requesters are the input ports that are requesting resources which are the outputs. The crossbar switch fabric allows multiple ones of the outputs to be accessible to more than one of the input ports.

9. Regarding claims 11, 21, 22, and 29, the input/output ports are considered data processing units, so the inputs could be considered processors while the outputs could be considered memories where the data from the processors will be stored—a memory could be considered a type of a data processing unit. Also, the transports mechanism shown in Fig. 1 is also called a crossbar switch matrix.

10. Regarding claim 12, the control logic algorithm in col. 6, lines 24-34 works recursively until the resources are allocated, so each time the algorithm starts over again, the priorities are recalculated.

11. Regarding claims 9 and 26, Calvignac et a. does not expressly disclose combining a resource priority with request priority, but it would have been obvious to combine the two priority assigning techniques in order to assign a priority. One would have been motivated to do this because it could maximize the number of input/output connections.

12. Regarding claims 8 and 30, as mentioned previously, the resource with the least number of requests would be chosen first under a resource priority scheme, so the priority is inversely related to the number of requests made for that resource. The selections are made on each cycle of the of a selection algorithm (for each arbitration cycle). See col. 6, lines 14-19.

Response to Arguments

13. Applicant's arguments filed January 20, 2004 have been fully considered but they are not persuasive.

14. In response to Applicant's argument that Calvignac et al. fails to suggest where a resource priority could be used in assigning the connections as opposed to the a requester priority, the Examiner respectfully disagrees. In col. 6, lines 55-63, Calvignac clearly states, "It will be appreciated that <u>many</u> other priority schemes would be possible within the rearranger…An important factor in the choice of such a scheme is that…the algorithm must ensure that each request has a high probability of being eventually selected." Thus, Calvignac explicitly suggests that it contemplated other ways of assigning the connections. As discussed previously in the rejection, using a resource priority approach would achieve similar results as the request priority approach, so it would still achieve the same goals that Calvignac sets out. Whether a designer chooses to use the request or resource priority approach is a matter of design choice, but it would have been very obvious to choose the latter approach in lieu of the request priority approach. Because Calvignac in fact suggests an algorithm like the resource priority approach, the Examiner believes that the rejection remains proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy Lee whose telephone number is (703)305-7349. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (703)305-4744. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TLL
Timothy Lee
June 9, 2004

HASSAN KIZOU
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